

THE GENUS *CULICOIDES* IN NORTHERN COLORADO
(Diptera, Ceratopogonidae)

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During the summer of 1942, about 5000 specimens of *Culicoides* were taken in a light trap operated by Prof. Miriam A. Palmer on the campus of Colorado State College. This material, together with a few specimens obtained from other sources, supplied the material on which this paper is based. Ten determined species were taken in the Ft. Collins light trap; an eleventh is added from the Denver Mountain Parks Area.

I am indebted to Miss Palmer for the illustrations of the male genitalia.

CULICOIDES HIEROGLYPHICUS MALLOCH

This was by far the most abundant species in the Ft. Collins light trap, being represented by 2430 specimens, May 19 to September 16. It remained important throughout the season and during August and early September accounted for more than half the light trap catch. Also taken at Evergreen, Colorado, July 25, 1942 (James) 2 ♀ ♀.

The male genitalia show some variation. Some specimens are as in the illustration in Root and Hoffman; in others, the submedian projections of the ninth sternite are much shorter and the foot-like apex of the claspers is less pronounced.

CULICOIDES OBSOLETUS MEIGEN

Light trap, Ft. Collins, 659 specimens, May 22 to September 18; unimportant, however, until about July 1, after which time it ran second in importance to *hieroglyphicus*.

CULICOIDES VARIIPENNIS COQUILLET

Light trap. Ft. Collins, 63 specimens, May 25 to August 31. Never present in great numbers in any catch.

CULICOIDES STELLIFER COQUILLET

Light trap, Ft. Collins, 198 specimens, June 29 to Sept. 12. Unimportant except during the period from July 6 to August 2. Also taken at Evergreen, Colorado, July 25, 1942 (James) 2 ♀ ♀.

CULICOIDES BAURI HOFFMAN

Light trap, Ft. Collins, 112 specimens, June 3 to August 5. Never of much importance; most abundant from June 15 to July 19.

CULICOIDES CREPUSCULARIS MALLOCH

Light trap, Ft. Collins, 481 specimens, May 16 to September 14. The first species to appear in the spring, it remained of approximately equal importance throughout the summer. Also taken at Evergreen, July 25, 1942 (James) 3♀.

CULICOIDES HAEMATOPOTUS MALLOCH

Light trap, Ft. Collins, 299 specimens, May 23 to September 14. Like *crepuscularis*, it remained of approximately equal importance throughout the summer, except for the tendency to show peaks of abundance in early July and early September.

CULICOIDES COCKERELLI COQUILLET

Light trap, Ft. Collins, 7 specimens, June 3 to August 1. All specimens evidently are the same species, yet the coloration and pattern on the mesonotum varies considerably. In Root and Hoffman's key, some specimens may trace to *luteovenus*, but the wing pattern is quite different in the two species.

The male genitalia are in general quite similar to those of *C. luteovenus*; they agree with Root and Hoffman's illustration in the general structures of the ninth tergite, the side pieces and the claspers. The seta-like hairs of the side pieces, however, instead of forming a dense patch, spread over the entire inner surface. The aedoeagus is similar in structure, except that its chitinous supports unite in the middle. The harpes are similar except that their bases are a little more slender and the apices are somewhat recurved.

Culicoides stonei James, new species

Female. Head yellowish-brown. Eyes narrowly separated. Antennae yellowish-brown; last five segments subequal, fusiform; basal ones bead-like; ratio of length of last five combined to that of basal eight combined about 10:10. Palpi brown; third segment considerably inflated. Thorax yellowish-brown, its pollen uniformly yellowish-brown, without evident markings; pleura yellowish; legs yellow. Wings without light or dark spots; macrotrichia

rather uniformly distributed. Abdomen yellow. Length, 1-1.5 mm.

Male. Coloration as in female. Antennal plume yellow. Apicolateral processes of ninth tergite very large, inner process of side piece much smaller than the dorsal, claspers gently bent and slender beyond middle, harpes slender, simple, and pointed apically, rather stout and bent over themselves basally.

Holotype, male, allotype female, and paratopotypes, 6 males and 16 females, FT. COLLINS, COLORADO, June 17 to August 31, 1942, at light (M. A. Palmer).

In Root and Hoffman's key, this species traces to *C. unicolor*. In the key to male terminalia, it runs to couplet 9, but the tip of

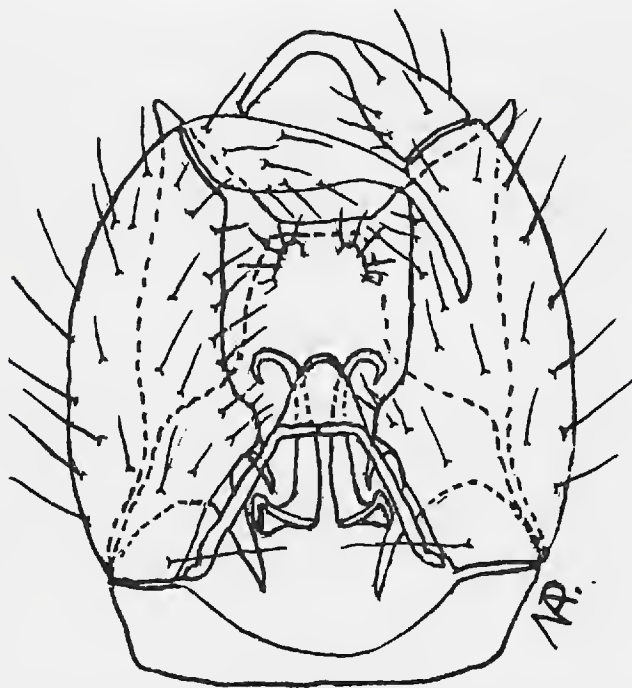


Figure 1. *Culicoides stonei* James, male genitalia, x 300.

the aedoeagus is rounded instead of being either pointed or truncate. I take pleasure in naming the species after Doctor Alan Stone, who compared a female specimen and a sketch of the terminalia with *C. melleus* and *C. unicolor*, and decided that it was distinct from both those species.

CULICOIDES SIMULANS R. & H.

Evergreen, Colorado, July 25, 1942 (James), 22♀, 1♂.

The one male available shows slight variations in the genitalia from the Root & Hoffman figure, in that the harpes end in a single curve outward instead of an S-shaped curve, and the aedoeagus is rounded at the apex. These variations, however, are probably not of specific value.

Culicoides palmerae James, new species

Female. Head uniformly brown. Eyes narrowly separated. Antennae light brown; last five segments of flagellum subequal, fusi-form; light basal one small, bead-like, ratio of combined length of last five to combined length of first eight 19:15. Palpi dark

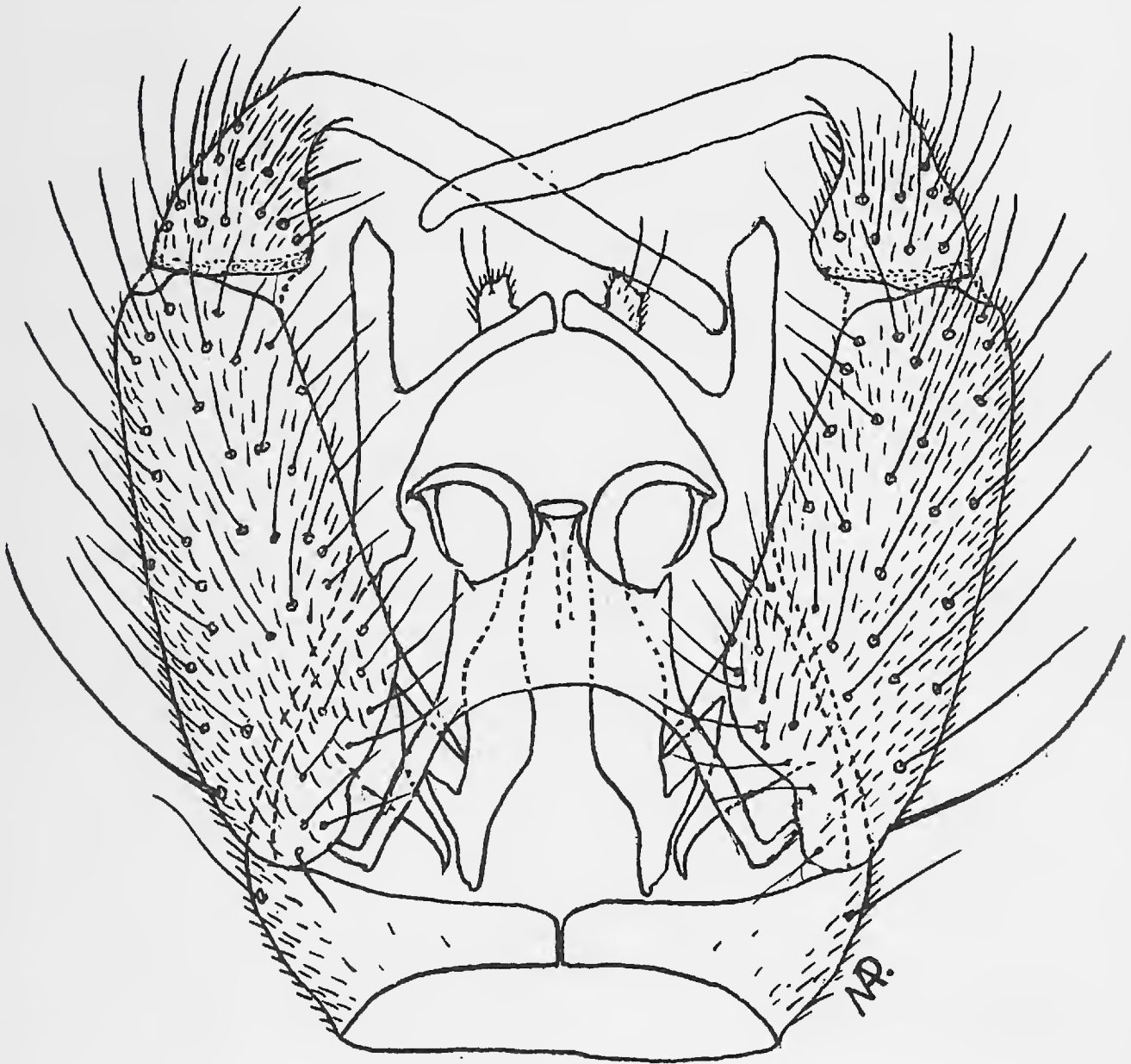


Figure 2. *Culicoides palmerae* James, male genitalia, x 300.

brown; second segment four times, third twice, as long as wide, third definitely swollen and with a sensory pit near apex; ratio of length of second, third, fourth, and fifth segments about 4:5:1:1. Proboscis black.

Mesonotum brown; a very narrow median longitudinal stripe on the anterior half darker; indistinctly defined areas behind sensory pits more or less reddish brown; submedian spots on posterior half and prescutellar area dark. Legs brown; hind tibia with a light basal annulus. Wings brown, with two distinct light spots,

one at the cross-vein and one in cell R_5 beyond apex of cell R_3 ; also light spots which are usually large but more or less indistinct at apices of R_5 , M_1 , M_2 , Cu_1 , and anal cells, and near middle of wing. Abdomen yellowish-brown to almost black. Spermathecae 2, oval, about 50 by 75, base of duct very narrowly chitinized, rudimentary spermatheca present. Length, 1-1.5 mm.

Male. Coloration as in female. Antennal plume light brown, darker apically. Wings somewhat more slender than in female, and with markings less distinct. Genitalia very large, one-fourth length of abdomen, and of a very characteristic type. Ninth tergite extremely convex, notched at apex, and with exceptionally large, somewhat truncated apicolateral processes; claspers sharply bent at basal fourth, the inner angle being distinctly an acute one (about 60°); claspers slender beyond bend; aedoeagus and harpes also characteristic.

Holotype, male, allotype, female, and about 500 paratypes, male and female, FT. COLLINS, COLORADO, June 2 to August 26, 1942, at light (M. A. Palmer).

The thoracic pattern is indistinct; therefore, in Root and Hoffman's key (Amer. Jour. Hygiene, 25:152-154, 1937) this species should be placed in the second half of couplet 10, where it will trace best to *simulans* Root & Hoffman. In the key to male genitalia, it fits the first alternative of couplet 1, but may immediately be separated from all species treated there by the large, blunt apicolateral processes of the ninth tergite, as well as by the form of the claspers. The relationship among Nearctic species is probably closest to *simulans*, though, to follow Root and Hoffman's grouping based on genital characters, *palmerae* is deserving of a separate group rank.

Light trap, Ft. Collins, 581 specimens (not all types), June 2 to August 26. Most important from June 10 to July 21, during which time it was at least as abundant as *C. hieroglyphicus*.

DISCUSSION

Seasonal abundance at Ft. Collins in 1942, as indicated by the light trap, is shown in Fig. 3. The graph is based on estimated weekly totals, the estimate being made by totaling the weekly catch, multiplying by seven, and dividing by the number of daily samples. For example, if the light trap were operated five nights of a given week, the total of the five samples was multiplied by seven-fifths.

Three types of graphs are represented. In three species, *cre-*

puscularis, *variipennis*, and *haematopotus*, the size of the catch remains fairly constant throughout the season. Three other species, *palmerae*, *stellifer*, and *baueri*, have a definite season of abundance, and outside of this season occur as stragglers, if at

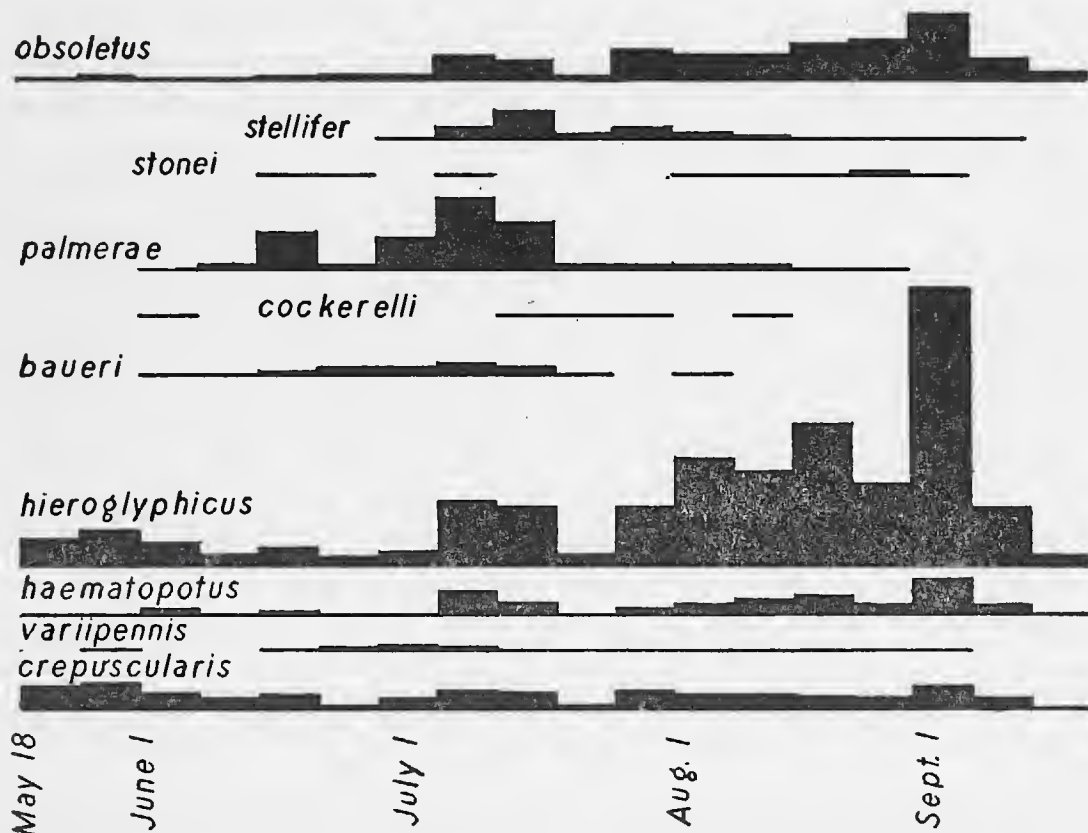


Figure 3. Seasonal abundance, by weeks of *Culicoides* species taken by light trap, Ft. Collins, Colorado, May 18 to September 18.

all. A third type, represented by *obsoletus* and *hieroglyphicus*, is a combination of the first two; the species occur throughout the season, but attain a definite peak of abundance in the late summer. *Cockerelli* and *stonei* are too scarce to place in a definite type, though they seem to belong to the second one.